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ABSTRACT

This document reports the findings of a study of children's comprehension of stories containing inconsistent information. The subjects were 84 children in kindergarten and the second, fourth and sixth grades. Twelve subjects from each grade listened to two stories and twelve other subjects from grades 2, 4, and 6 read two stories. Each subject was presented with one story in which the information was consistent and one story in which it was not consistent. Significant grade differences in recognition of anomalous information were found among the subjects who listened to the stories, but not among those who read the stories. The recognition of the anomalous information was positively related to story comprehension for the sample as a whole. These findings are discussed in terms of recent theories of the role that children's prior knowledge of the world and of story situations may play in children's story comprehension. (BH)

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The Effect of Inconsistent Script Information on Children's Comprehension of Stories about Familiar Situations

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The Effect of Inconsistent Script Information on Children's Comprehension of Stories about Familiar Situations

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The manner in which a person's existing knowledge of events and situations influences the comprehension and recall of prose has been impressively demonstrated in much recent research (e.g., Anderson, Reynolds, Schallert, & Goetz, 1977; Anderson, Spiro, & Anderson, 1978; Pichert & Anderson, 1977; Thorndyke, 1976). For example, Anderson, Reynolds, Schallert, & Goetz (1977) demonstrated the effect of different experiential backgrounds on story interpretation and recall when music majors and physical education students differently interpreted identical passages in ways consistent with their own experiences; while Thorndyke (1976) found that people use their prior knowledge to generate plausible inferences during comprehension of text.

That knowledge importantly contributes to comprehension has long been recognized, but serious investigation of this relationship awaited adequate conceptualization of what people, in fact, knew. Recent theoretical formulations of the way complex event knowledge may be represented in memory (e.g., "frames," Charniak, 1975; Minsky, 1975; "scripts," Nelson, 1977; Schank & Abelson, 1977; and "schemata," Anderson, 1977; Rumelhart & Ortony, 1977), however, have provided useful vehicles for talking about and investigating private, but common, experiential knowledge.

Thus, in previous research by this investigator (Pace, Note 1), children as young as five were shown to have rather complete knowledge of common, everyday situations, such as shopping in a supermarket, or those kinds of

stereotypical event sequences which Schank and Abelson (1975) have characterized as "scripts." Furthermore, children from kindergarten through sixth grade apparently could use their scripts for such situations to comprehend stories about these events and to supply explanatory information which was not presented explicitly in the story passages. However, because the stories were modeled on scripts for these situations and the information in them was consistent with children's experiences, participating students did not need story information to answer comprehension questions correctly. They could simply rely on their own knowledge. Hence children's sensitivity to text-specific information was not revealed.

Quite obviously, while use of existing knowledge may be essential for comprehension, prose ordinarily is not isomorphic with one's own experiences. Nor would we want it to be. If, as Pearson and Johnson (1978) suggest, we understand what is new in text within the context of what we already know, then an important comprehension skill would seem to be the ability to distinguish novel or discrepant information in a passage from the knowledge we possess. This ability, furthermore, may be one which develops during the school years. For example, Kagan (1971) found that younger children often fail to realize that the information needed to solve a problem is limited to the facts presented and need not involve their own experiences. Also, older elementary students were shown (Pace, Note 1) to have better comprehension than younger children of stories about novel situations for which none of the children had prior knowledge. Developmental trends were evident in this case when the contribution of event knowledge was minimal. Thus, when existing knowledge is inadequate or inappropriate for comprehension, or when it is incompatible with passage information, younger

elementary students, especially, may experience problems in comprehension.

One of the purposes of this study, therefore, was to assess the ability of elementary-school children to distinguish between what they may know and what a story or other prose passage says if they are not otherwise motivated or forewarned to look for discrepant information. If a story seems to be about a familiar situation, younger children may be relatively insensitive to differences between story content and their own experiences.

An additional aim of this research was to investigate whether the modality of presentation would affect children's awareness of script-inconsistent information. Olson and Hildyard (in press) have suggested that written text may be better able than oral discourse to present information that cannot be derived from existing knowledge alone. While part of the difference between oral and written language may be stylistic, in that written language tends to be both more formal and explicit than oral discourse, some evidence (Hildyard, Note 2) indicates that passages identical in form may be processed differently by readers and listeners. Hildyard suggested that listeners, both children and adults, may be more attentive to the theme of a story, tending to disregard unessential details. Readers, on the other hand, appear to be more aware of surface features and of information that is explicitly presented in a text. This sensitivity to what is written, she adds, may be as aspect of the attainment of literacy. It could also reflect the concept of "distancing," as discussed by Sigel and his colleagues (Sigel & Saunders, 1979), by which written text, with its absence of a social context, could be viewed as more removed from a child's immediate experience than oral discourse. This kind of "distancing"

may be an acquisition of schooling. One hypothesis of this study, therefore, was that readers would be more sensitive than listeners to story information which conflicted with usual expectations, especially if this inconsistent information were supporting detail rather than major theme. Another hypothesis was that older elementary students, regardless of the modality of presentation, might notice such anomalies more than younger children, since experience with schooling, among other factors, may affect children's inclination to attend to text-specific information. Additionally, if students are reading stories which contain script-discrepant information and they notice these anomalies, they could take longer to read them than script-consistent narratives. Inconsistent stories, then, might have longer reading times than consistent ones. They may also be less well understood generally, so comprehension of consistent stories was expected to be better.

Method

Materials

Two forms of two different short stories were written about situations which had previously (Pace, Note 1) been shown to be highly familiar even to kindergarten children: shopping in a supermarket and making a peanut butter-and-jelly sandwich. One form of each story contained an item inconsistent with children's demonstrated knowledge of such situations, while the other form did not. Inconsistencies were determined by asking groups of second, fourth, and sixth graders to indicate which items in a list would usually be sold in a supermarket and which would not and which items in another list could be used to make a peanut butter-and-jelly sandwich and which would not. Students at each grade level were nearly unanimous in

deciding that a color TV set would not be sold in a supermarket and that ice cream would not be used on a peanut butter-and-jelly sandwich.

A 35 mm slide of each story was prepared for the reading condition. For the listeners, the same stories were recorded on a cassette tape recorder by an adult female who had had extensive experience teaching in elementary schools.

Participants

Participants were 84 children in public elementary schools. Twelve children each in kindergarten and the second, fourth, and sixth grades listened to the stories, while 12 other children in each of grades 2, 4, and 6 read them.

Procedure

Each child was seen individually during a session which lasted approximately one-half hour. The readers sat 45 cm (18 in) in front of the screen of a Singer Caramate II projector on which the story slides were shown. Participants were first tested for their knowledge of the words in the stories in order to determine if they could read them all readily. One second grader, who had difficulty reading many of the words, was consequently replaced by a classmate who could read them.

Following two practice stories used to accustom students to the procedure being employed, readers were shown a script-consistent story about one of the familiar situations and one script-inconsistent story about the other. Order of presentation was counter-balanced for both story situation and story type.

Students controlled the projection of the stories themselves. They were asked to read through each story once at a normal rate and to stop reading

-- and remove the slide from the screen -- when they thought they had understood the story. The time each story was visible on the screen was measured in seconds and hundredths of a second with a Standard Electric Time Corporation stop-clock. Comprehension questions about each story were asked after that story slide had been viewed. One of these questions probed for awareness of the anomalous information. The procedure for the listeners was similar, except that they heard the tape-recorded stories instead of reading them.

Results

Reading Time

Log transformations were performed on all reading times to normalize the distributions. Log transformed reading time was then the dependent measure in an analysis of covariance, with time on one of the practice stories used as the covariate to control for individual differences in reading rate not related to story form. Grade was a between-subjects factor and story form (consistent/inconsistent), a repeated measure. Grade was the only significant main effect with this analysis, F (2, 32) = 16.52, $p < .0001$. The inconsistent stories did not take longer to read; the mean times for both story forms were nearly equivalent. However, post hoc tests showed that the second graders, as expected, took significantly longer on both forms than the older students.

Closer inspection of the data, though, revealed a possible time-related effect. The untransformed time of 22 sec divided the group of 36 readers nearly in half. Nineteen took less than 22 sec, 17 took longer. Of those 12 students across all three grades who failed to notice the anomalous information in the inconsistent story, nine read it in less than 22 sec,

and three took more time; while of those 24 students who did notice the anomaly, 10 read the inconsistent story in less than 22 sec, compared to 14 whose times were greater. A chi-square test of this distribution just failed to reach significance at the .05 level ($p = .059$). This suggests the not surprising possibility that children who take longer to read a passage, and thus probably attend to it more carefully, will be more likely to notice unusual information in it.

Awareness of Anomaly

Inspection of the protocols for the readers revealed no grade-level differences in their awareness of the story anomalies. The same proportion -- two-thirds -- of the students in each grade (2, 4, and 6) noticed the discrepant information. The listeners, however, performed very differently. Nine of the 12 kindergartners, and the same proportion of second graders failed to detect the script-inconsistent items. By contrast, all but two of the fourth-grade listeners and three-quarters (9) of the sixth graders did detect the anomalous information. The chi-square test for this distribution was significant, $p = .0026$.

Comprehension Scores

Scores on the comprehension questions were compared in three separate analyses of variance -- one for readers only, another for listeners alone, and the third for the listeners and readers in the second, fourth, and sixth grades. In each case, grade was a between-subjects factor and story form a repeated measure. In the analysis which included both readers and listeners, modality of presentation was an additional between-subjects variable. No significant differences were obtained in the ANOVA for readers, although the effect of story form approached significance (a p

value of .075), since the consistent story mean was greater than that for the inconsistent stories. This difference was significant for the listeners, F (1, 33) = 14.73, $p < .0004$, and in the combined ANOVA, F (1, 66) = 10.82, $p < .0016$. In each case, mean scores for consistent stories were greater than those for the inconsistent ones. For the listeners, the effect of grade just missed significance at the .05 level ($p < .052$), though Newman-Keuls tests of grade differences showed that sixth graders scored significantly better than second graders, who had a slightly lower grade mean than the kindergartners.

A further analysis of the errors made by all participants reveals the expected relationship between awareness of script-inconsistent information and comprehension scores. Of the total of 23 errors made by all readers, 10 or 43.4 % were on the item pertaining to the story anomaly. (Chance performance would have been 25%.) This relationship is even more pronounced among the listeners, especially those in the lower grades. One half of all errors (16 of 32) were on the inconsistent item. However, only one of the eleven errors made by fourth and sixth graders was on this item. By comparison, 15 of the 21 errors by kindergartners and second graders, or 71.4%, were on the inconsistent item. This result follows from the comparative failure of these groups to detect the anomalous information.

Discussion

The results of this study suggest that children's awareness of information inconsistent with their own knowledge or expectations may be influenced by whether they read or listen to the story in which it is embedded and also that this modality difference may be age-related. Thus, Olson and Hildyard's (in press) contention that information which cannot be obtained from

existing knowledge might be better understood if presented in writing, rather than orally, receives some support from these findings. If younger readers were having to expend considerable effort at recognizing words, an opposite result might have been anticipated; such additional word processing may have depressed comprehension (Perfetti & Hogaboam, 1975). Perhaps, however, second-grade readers were attending to words very carefully and therefore may have been more aware of script-inconsistent information than their age-mates who listened. One of the functions of written discourse, then, may be to focus attention on details of the text, as Hildyard (Note 2) has suggested, provided readers take the time to attend to such details. This option is not available to listeners, who ordinarily (without a tape recorder) cannot control the time of the messages they are receiving.

The pronounced grade-level differences among listeners in their awareness of story anomalies, however, can only be illuminated by the suggested processing differences between reading and listening if it is assumed that older elementary students transfer skills acquired through considerable practice in reading to listening tasks. While it is difficult to separate the effects of schooling and literacy (Scribner & Cole, 1978), findings by Wagner (1978a, 1978b) suggest that schooling may facilitate the acquisition of certain cognitive skills because of the kinds of task demands it imposes. Older children, with more experience in school, may simply do better on school-like tasks. The difficulties of the younger listeners, however, primarily involved information inconsistent with their own experiences. As before (Pace, Note 1), comprehension of story details which corresponded to children's expectations, was high at all grade levels tested. Thus these younger students, without the advantage of a written

text, may have trouble distinguishing between what they know and what a story says, particularly if the story seems to concern a familiar situation and they have little motivation to attend carefully to the details. These narratives are, after all, to borrow Schank and Abelson's (1975) words, "... very boring little stories." Once children recognize such a story to be about a known event, they may "tune out," since the story inherently has little about it to attract their interest. This possibility may usefully serve as a caution to elementary teachers who expect students to attend to information which is neither attractive nor startling in itself nor consistent with what they already know.

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